

MANUFACTURING EXTENSION PARTNERSHIP

Success Stories from the Field

Tanglewood Conservatories, Ltd.

Maryland Technology Extension Service

Design Optimization

Client Profile:

Tanglewood Conservatories, located in Denton, Maryland, designs and builds elegant, 19th century style conservatories ranging in cost from \$50,000 to several million. Tanglewood's architects visit every customer's home to custom design each conservatory to match the adjoining house per the client's requirements. The company has built several hundred structures in the U.S. in cities such as Boston, New York, San Francisco, and Baton Rouge, and recently has exported two conservatories to Shanghai, China. The company has been experiencing rapid growth. Its sales were about \$3 million last year, about 50 percent more than in 2003. Orders have increased to as many as 20 conservatories per year, with the company's 30 employees taking as long as six months to design a structure, and up to a year to build each one.

Situation:

Founded in 1993 by architect Alan Stein, Tanglewood Conservatories started out building 200 to 300 square foot conservatories with hand-crafted artisan woodworking. The company's conservatories are in a category separate from the prefabricated sunrooms and kit conservatories that have become popular with some builders. The company makes its windows and doors, rather than buying these items from a vendor, and also custom designs each room from scratch. A typical Tanglewood conservatory might feature mahogany woodwork, dentil molding, a copper roof and ornate cupola at its center. Each conservatory is prefabricated and assembled in the factory, prior to being disassembled into subsections and shipped to the job site for construction. As orders grew, the company started having problems maintaining quality. Parts were being shipped to the wrong job sites and mistakes were being made in the manufacturing process. The conservatories were in such high demand that Tanglewood was being forced to transition from a builder to a manufacturer with the help of the Maryland Technology Extension Service (MTES), a NIST MEP network affiliate.

Solution:

A team of MTES consultants dissected Tanglewood's manufacturing process and recommended investments in technology aimed at boosting efficiency. The overall objective was to help the company to transform from its relatively low-technology manufacturing process into a lean, computer driven operation in an effort to cost effectively keep up with rising demand. MTES suggested that all of the conservatory structures be completely designed in three dimensions on a computer prior to releasing the drawing package. The part specifications could then be sent to a CNC router for machining. This process allows the company to minimize mistakes and reduces the labor needed to make many of the components. MTES assisted the company in selecting a 3D solid modeling CAD package to meet this objective, and worked with the company designers to develop a detailed shop drawing package and work order system to communicate the design requirements to production. Previously Tanglewood would build the entire conservatory in the shop, and then take it apart and reassemble it on site. With a computerized system, Tanglewood can now make many of the pieces, then take them out and

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assemble them in place on site at the client's home.

Results:

- * Increased sales by \$1.5 million.
- * Reduced costs by \$300,000.
- * Invested more than \$300,000 in new technology and equipment.
- * Automating processes allowed company craftsmen to spend more time doing detailed hand work.

Testimonial:

"As we grew and did more complex projects, we began to run into problems. We realized we would not be able to grow beyond where we were without making a change. The concept is that you're actually building it in the computer. We know that if the part fits in the computer, it will fit when we put it together on site. If we're able to implement everything suggested by MTES, we'll cut the time it takes to make a conservatory in half."

Alan Stein, President